LOWER POTOMAC DIRECT
Pre-Assessment Report

PREPARED FOR:

MONTGOMERY COUNTY

DEPARTMENT OF ENVIRONMENTAL PROTECTION

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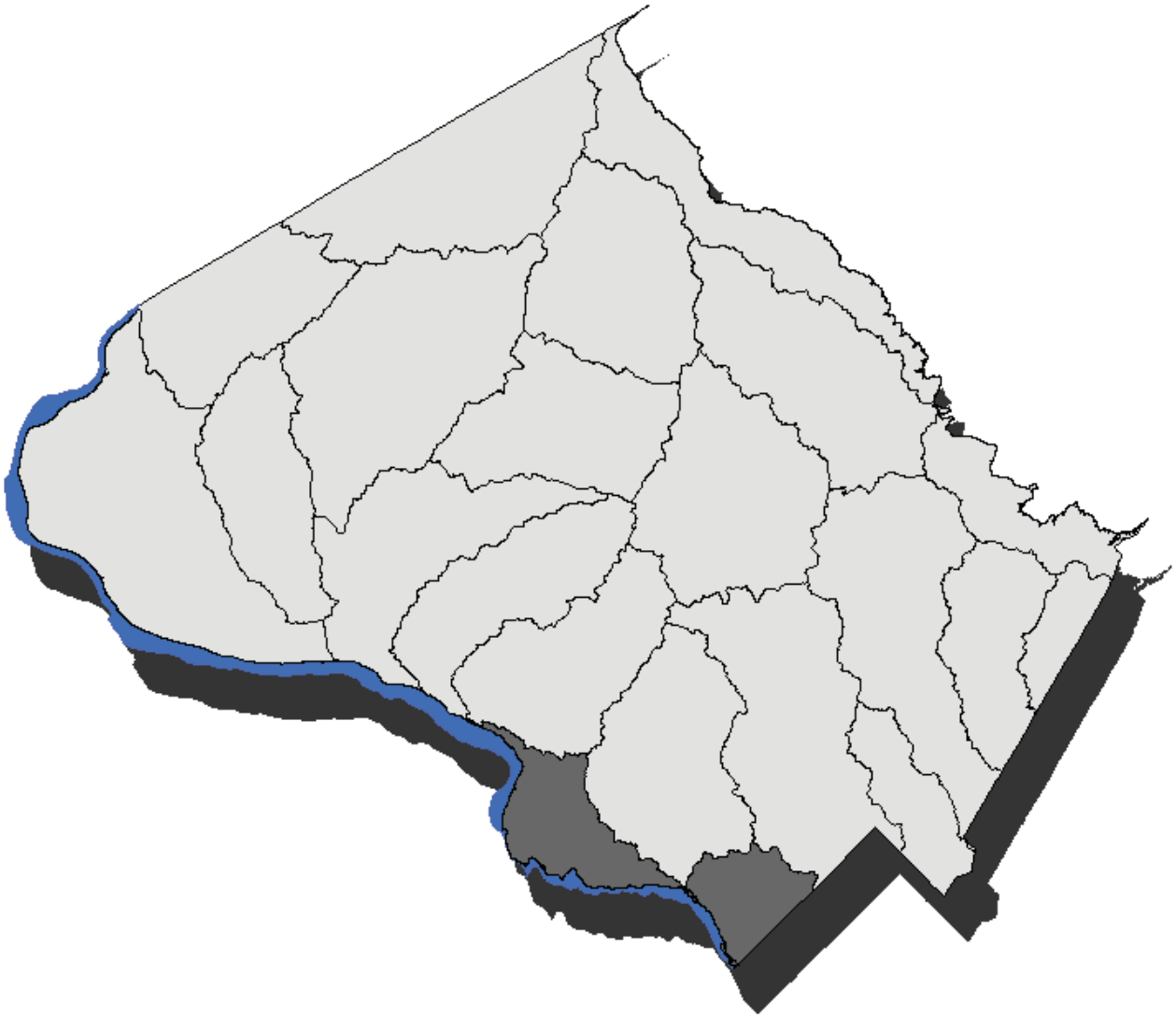

May 2011

PRE-ASSESSMENT REPORT

Lower Potomac Direct

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Prepared for:

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1. INTRODUCTION

To successfully meet its regulatory requirements and environmental goals, Montgomery County must complete watershed assessments until all land area in the County is covered by a specific action plan to address the water quality problems that are identified through the assessments. No watershed assessment or action plan has yet been completed for the Lower Potomac Direct and two of its three component subwatersheds, Rock Run and Little Falls. Therefore, the County has undertaken preparation of this "pre-assessment" as the first step toward completing a watershed restoration plan that will, ultimately, address changing watershed conditions, apply new restoration technologies, and refine implementation strategies, as needed to achieve watershed restoration success. The Recommended Framework for Watershed Restoration Plans describes this process in detail and provides background information on how the pre-assessments are being developed and will evolve into watershed restoration plans.

1.1 REGULATORY AND PROGRAMMATIC CONTEXT

The Lower Potomac Direct watershed in Montgomery County drains to the Potomac River Montgomery County assessment unit (MD-02140202). Based on the 2008 Integrated Report (combined 303(d) List and 305(b) Report), this part of the Potomac River basin is impaired for phosphorus as of 1996, for total suspended solids as of 1996, is biologically impaired as of 2006 (combination of benthic and fish bioassessments), and for PCBs in fish tissue as of 2008. In 2007, the Maryland Department of the Environment completed a TMDL for PCBs in the Potomac River, along with Virginia and the District of Columbia.

Each watershed restoration plan must also meet the following water quality goals defined in the County's Chapter 19, Article IV. Water Quality Control, adopted in 1994:

- Protect, maintain, and restore high quality chemical, physical, and biological conditions in the waters of the state in the County
- Reverse past trends of stream deterioration through improved water management practices
- Maintain physical, chemical, biological, and stream habitat conditions in County streams that support aquatic life along with appropriate recreational, water supply, and other water uses
- Restore County streams damaged by inadequate water management practices of the past, by reestablishing the flow regime, chemistry, physical conditions, and biological diversity of natural stream systems as closely as possible
- Help fulfill interjurisdictional commitments to restore and maintain the integrity of the Anacostia River, the Potomac River, the Patuxent River, and the Chesapeake Bay

- Promote and support educational and volunteer initiatives that enhance public awareness and increase direct participation in stream stewardship and the reduction of water pollution.

1.2 GOALS OF THE PRE-ASSESSMENT

The specific goals of the pre-assessment for the Lower Potomac Direct are:

- Summarize the current environmental conditions of the watershed including 303(d) listed waterbodies and 305(b) reports and indices of biological integrity

- Describe the current land uses of the watershed, particularly imperviousness and its distribution across land uses, as well as forest cover, especially as it relates to stream buffer

- Describe existing stormwater management practices

- Conduct a neighborhood-scale desktop analysis of stormwater BMP retrofit opportunities using priorities developed with County staff.

Once the pre-assessment is completed for Lower Potomac Direct, a full watershed restoration plan will be undertaken. The watershed restoration plan will update any environmental condition information and include results from field investigations to identify specific watershed problem areas and restoration sites. Following the field investigations, concept plans would be developed for candidate restoration sites that will serve as the action inventory. Pollutant loading estimates and public involvement would also be conducted to assign priorities and integrate the watershed restoration plan into the Countywide Coordinated Implementation Strategy.

2. ENVIRONMENTAL CONDITIONS

2.1 THE SUBWATERSHEDS OF THE LOWER POTOMAC DIRECT

The Lower Potomac Direct includes a number of small tributaries in the southernmost part of the County which drain directly into the Potomac River, hence the name, Lower Potomac Direct. Figure 2-1 delineates all of the Lower Potomac Direct which includes the subwatersheds: Muddy Branch, Watts Branch, Rock Run, and Little Falls.

This pre-assessment report focuses on the Rock Run and Little Falls subwatersheds only, referred to as the "Rock Run Little Falls subwatershed grouping." Rock Run and Little Falls are the most distinct and most populated subwatersheds in the Lower Potomac Direct watershed (Figure 2-2). The Muddy Branch and Watts Branch subwatersheds have been evaluated previously and are currently subjects of implementation plan development.

The Rock Run and Little Falls subwatershed grouping drains directly into the Potomac River along the border with Virginia and is artificially truncated by the border with Washington, D.C. The Little Falls subwatershed crosses into the northwest quadrant of Washington D.C. The border between the two subwatersheds is roughly demarcated by the Washington Beltway (I-495).

2.1.1 Rock Run

The Rock Run subwatershed includes a number of small tributaries and notable developments such as Potomac, Great Falls, and Cabin John.

The Rock Run subwatershed drains primarily residential land uses and has an interesting history. The streams in this subwatershed are closely linked to the Potomac River floodplain and C&O Canal corridor. Gold-mining activity occurred in both areas in the years following the Civil War. Evidence of this, including large excavations, spoil piles, and U-shaped excavated channels where forests are regenerating, can still be found in some areas of the stream valleys.

The Rock Run subwatershed contains a mix of older residential areas interspersed with newer planned communities. Habitat conditions in the streams are generally good because of the forested stream valleys and relatively recent nature of large areas of development. Despite generally good habitat, the biological community in this subwatershed is showing signs of impairment, particularly within the macroinvertebrate community.

According to the Countywide Stream Protection Strategy (Montgomery County 2003), "All of Rock Run is designated as a watershed restoration area due to the impaired biological community and the need to comprehensively examine and address impaired stream conditions throughout the watershed."

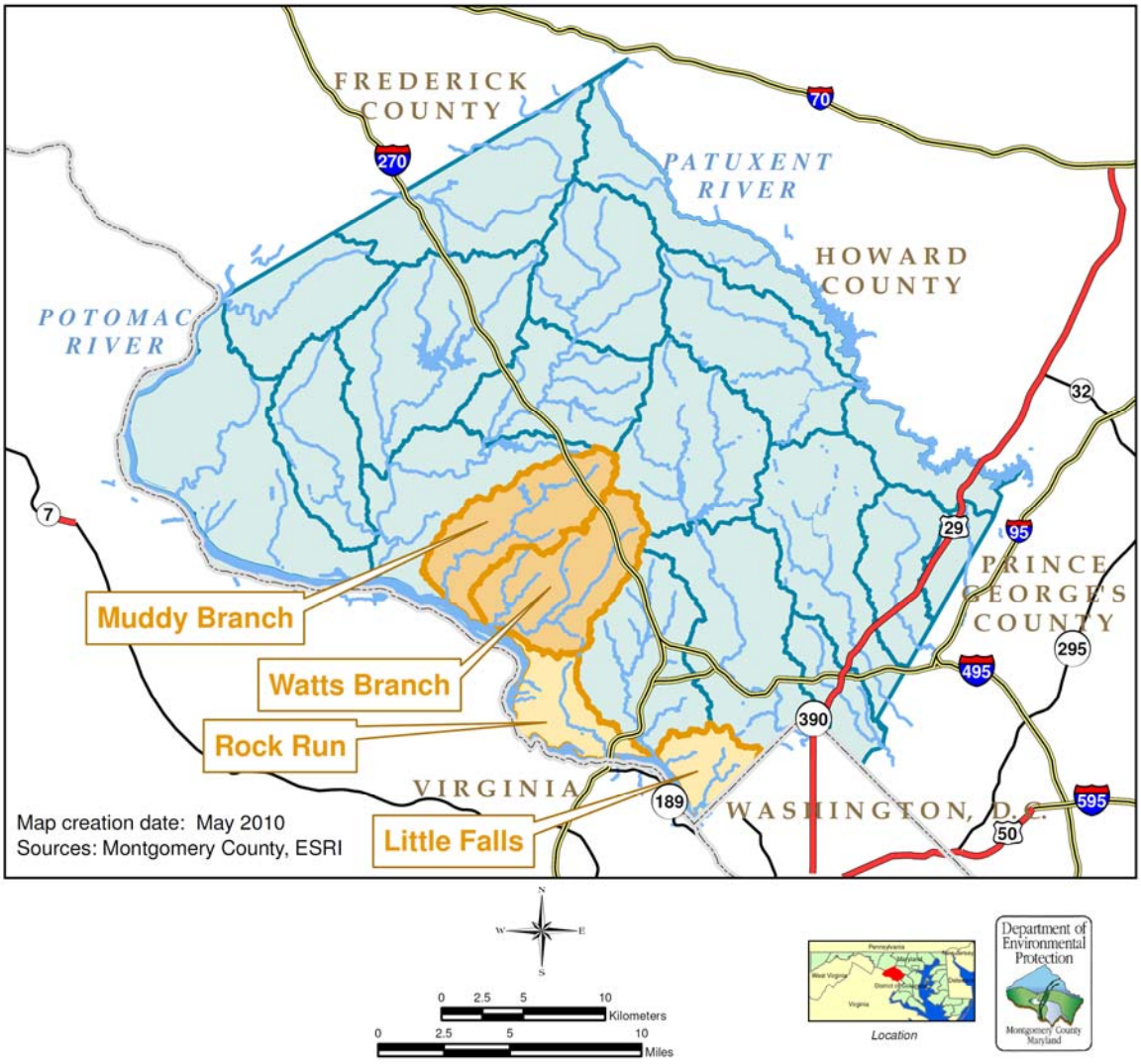

Figure 2-1. Lower Potomac Direct drainage in Montgomery County, Maryland, comprising four subwatersheds – Muddy Branch, Watts Branch, Rock Run, and Little Falls

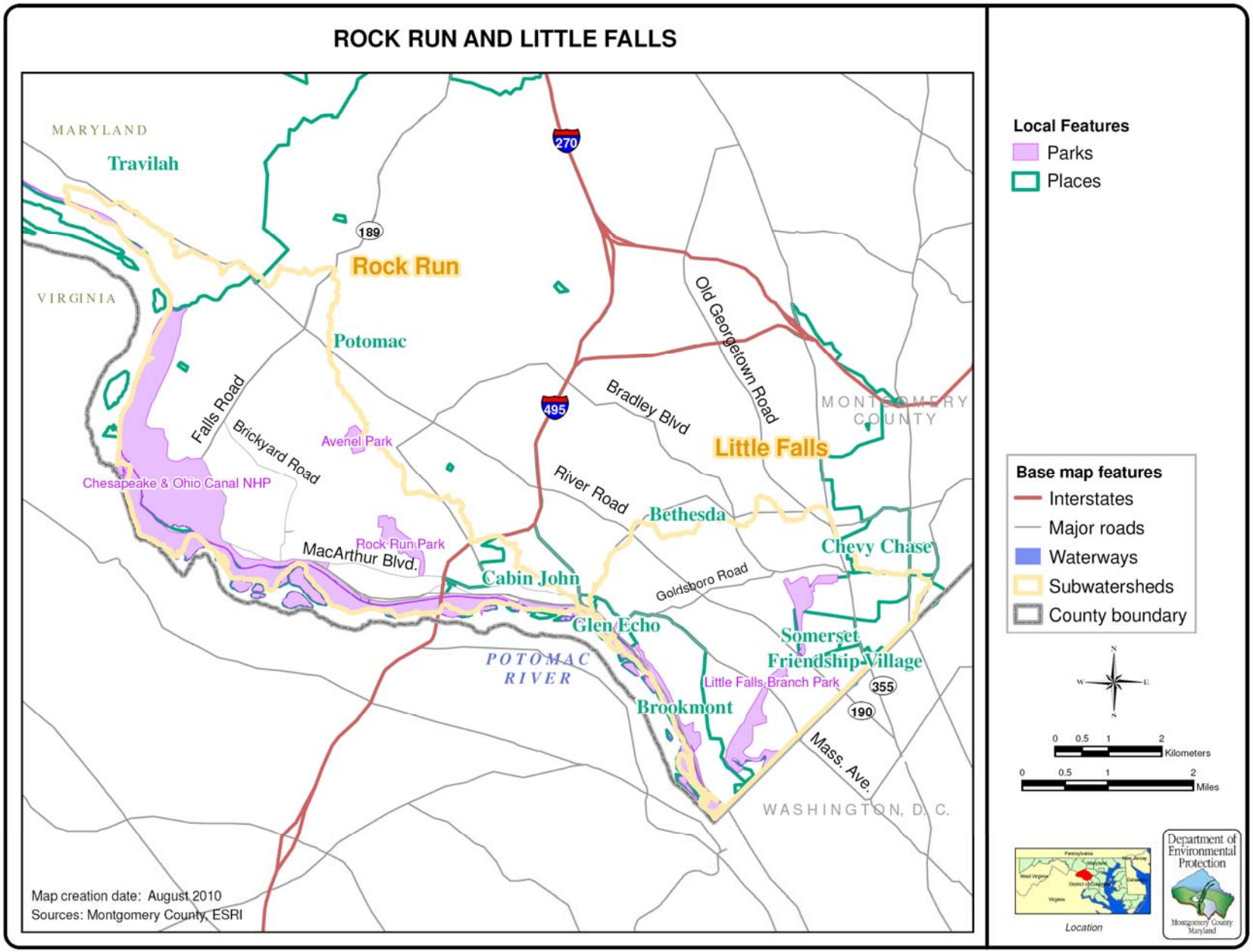

Figure 2-2. Rock Run and Little Falls subwatersheds in Montgomery County, Maryland

2.1.2 Little Falls

A number of named tributaries exist within the Little Falls subwatershed, part of which is contained within Washington D.C. Major developments entirely or partially within the subwatershed include Bethesda, Glen Echo, Chevy Chase, Somerset, and Brookmont.

Little Falls watershed contains one of the County's most urban and altered stream systems. Stream conditions remain poor with little biological life or diversity above MacArthur Boulevard. Recently completed stream restoration projects in the areas below Massachusetts Avenue may enable successful reintroduction of some native fish and amphibians (MCDEP 2003).

Most of the development in this watershed occurred before today's requirements for natural stream buffer, wetland, and floodplain protection and for stormwater runoff controls. The original drainage pattern of Little Falls has been extensively altered, with much of the original headwaters and tributaries enclosed in storm drain pipes or channelized. What remains of the headwaters now receives drainage from highly impervious areas in the Bethesda Central Business District and Friendship Heights. Channelized and piped areas throughout the watershed deliver flows into downstream channels at accelerated velocities and often with very high temperatures after flowing through open concrete channels or across paved surfaces warmed by the summer sun. These stormflows seriously affect the remaining natural channels downstream.

2.2 LAND-USE CHARACTERISTICS

Land-uses within the subwatersheds are summarized in Table 2-1 and shown in Figure 2-3.

Table 2-1. Land use in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

Land-use Category	Rock Run		Little Falls	
	Acres	Percent of Total	Acres	Percent of Total
Open Urban Land, Forest, Institutional, Water, Wetlands	3106.5	41.2	1117.6	22.2
Low-density residential	2879.7	38.2	220.6	4.4
Medium-density residential	1122.7	14.9	2753.8	54.8
Roadways	365.8	4.9	469.8	9.4
Commercial	34.2	0.5	222.0	4.4
Agricultural operations	21.6	0.3	26.7	0.5
High-density residential	2.4	0.0	177.5	3.5
Industrial	0.0	0.0	35.9	0.7
TOTAL	7532	100	5023	100

Data source: Maryland Department of Planning, 2002

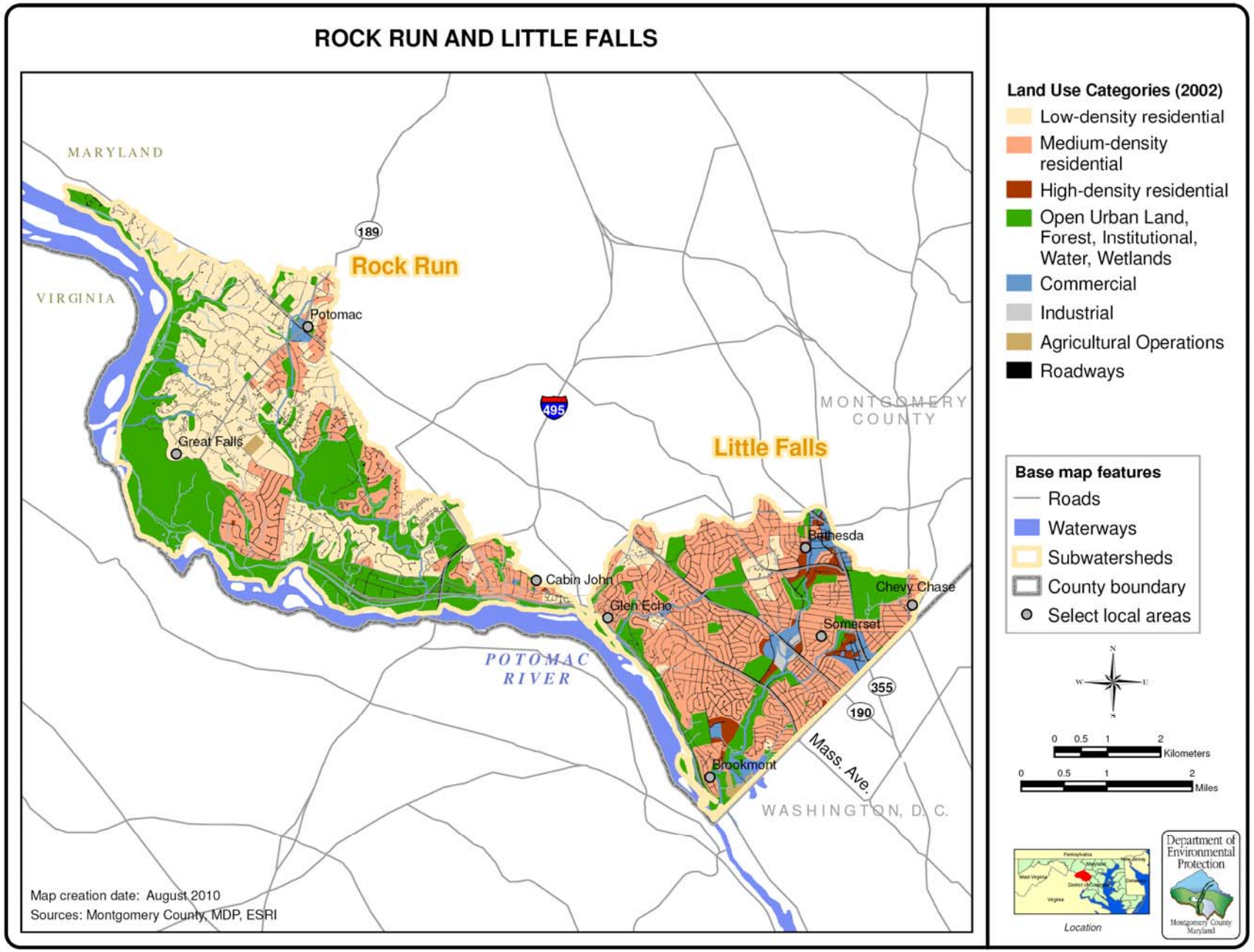

Figure 2-3. Land use in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

Rock Run subwatershed, which covers 7,532 acres, is dominated by a mix of open urban land, forest, and institutional property (41%) and low density residential (38%). The Little Falls subwatershed is slightly smaller at 5,023 acres and is dominated by medium-density residential land use (55%).

2.3 IMPERVIOUS FEATURES

Impervious land cover constituents across the two subwatersheds are illustrated in Figure 2-4 and specified in Table 2-2. The Little Falls subwatershed contains more than twice the impervious cover as the Rock Run subwatershed. County roads and single-family detached roofs are the primary constituents of imperviousness in both subwatersheds. Areas of contiguous imperviousness in and around Bethesda, Somerset, and Potomac are obvious in Figure 2-4.

Table 2-2. Impervious cover by type for Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

Major Impervious Constituents	Rock Run	Little Falls
Roads (acres)	**365**	**470**
County jurisdiction roads	285	364
Other roads	80	106
Parking Lots (acres)	**71**	**189**
County parcels (lots > 1 acre)	1	10
County parcels (lots < 1 acre)	1	13
Other	69	166
Roofs (acres)	**326**	**557**
Single-family residential, detached	257	401
County parcels	2	19
Other roofs	67	137
Other (acres)*	**43**	**54**
Sidewalks	11	37
Paved Courts	31	16
Schools	1	**1**
Total Impervious Acres	**805**	**1270**
Percent Imperviousness	**11%**	**25%**

* Driveways have not been included in these impervious cover calculations.

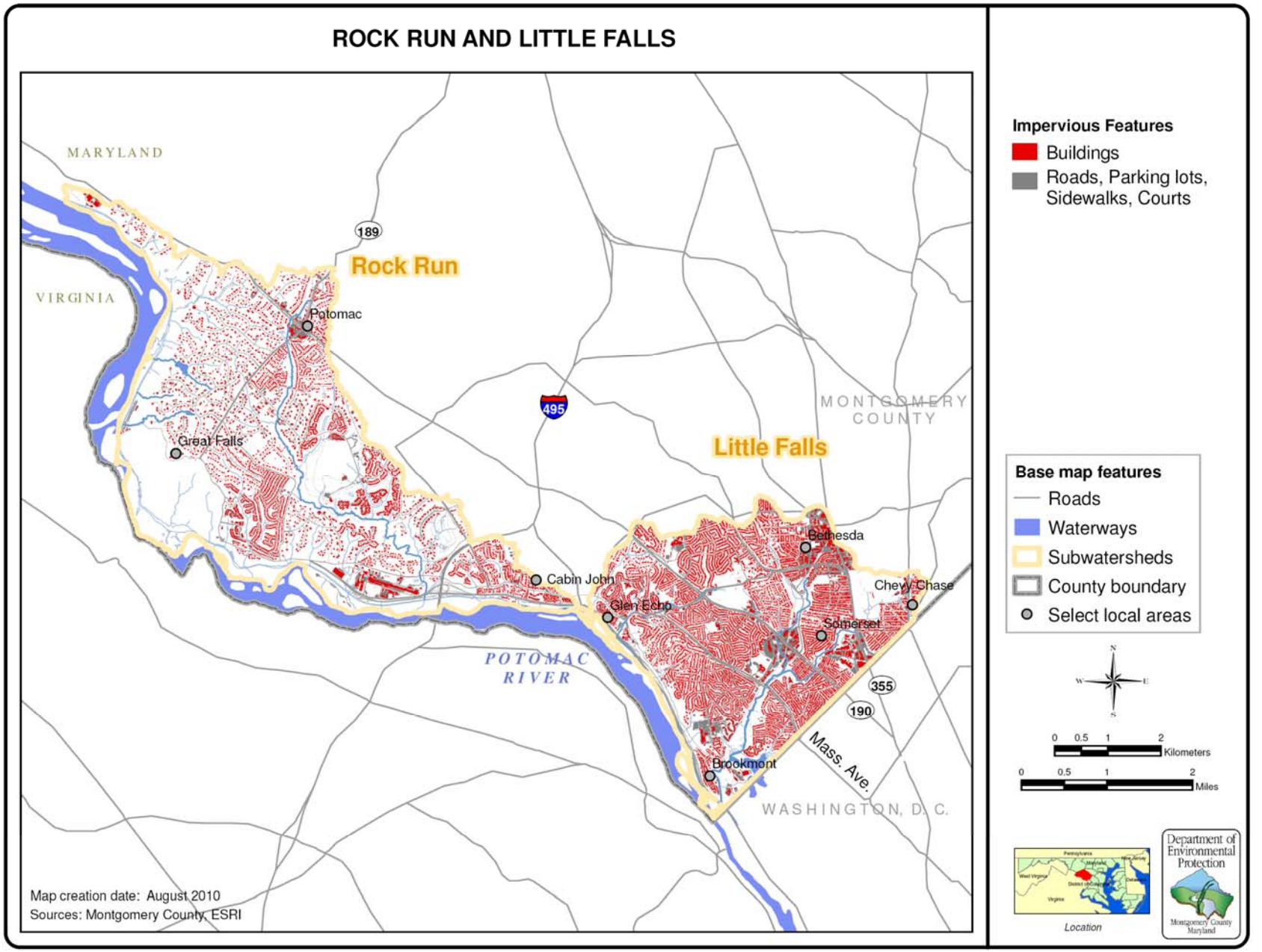

Figure 2-4. Impervious cover in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

2.4 HYDROLOGIC SOIL GROUPS

Figure 2-5 illustrates the extent of the three hydrologic soil groups found in Rock Run and Little Falls subwatersheds. There are no Group A (best draining) soils in the subwatershed grouping. The majority of soils in the Rock Run and Little Falls watershed are B soils. Rock Run subwatershed has significant areas of C soils, particularly along the Potomac River. A small portion of Rock Run subwatershed, along the Rock Run stream bank zone (riparian zone) and discrete areas in Little Falls subwatershed are D soils (worst draining).

2.5 FOREST COVER

Forest cover tends to follow existing stream channels, as illustrated in Figure 2-6. The two subwatersheds contain 3,430 acres of forest in total; 2,853 acres in Rock Run and 577 acres in Little Falls. A substantial portion of Rock Run, 38%, is covered by forest, with only 11% in the case of Little Falls. Much of the contiguous forest cover in Rock Run is on public land, specifically park land.

Wetlands are quite scarce in the two watersheds, covering only 135 acres in total. Of the six wetland types illustrated in Figure 2-7, the palustrine and riverine types predominate.

2.6 BIOLOGICAL INDICATORS OF WATERSHED CONDITION

Figure 2-8 shows the stream condition rating, as well as the sampling point used to generate that stream condition score. Figures 2-9 and 2-10 show the Benthic IBI and Fish IBI scores, respectively, at sampling sites in the two subwatersheds. Most monitored sites showed fair or poor stream resource conditions, with only one site in Rock Run showing a good rating. No areas were rated excellent in the Rock Run or Little Falls subwatersheds.

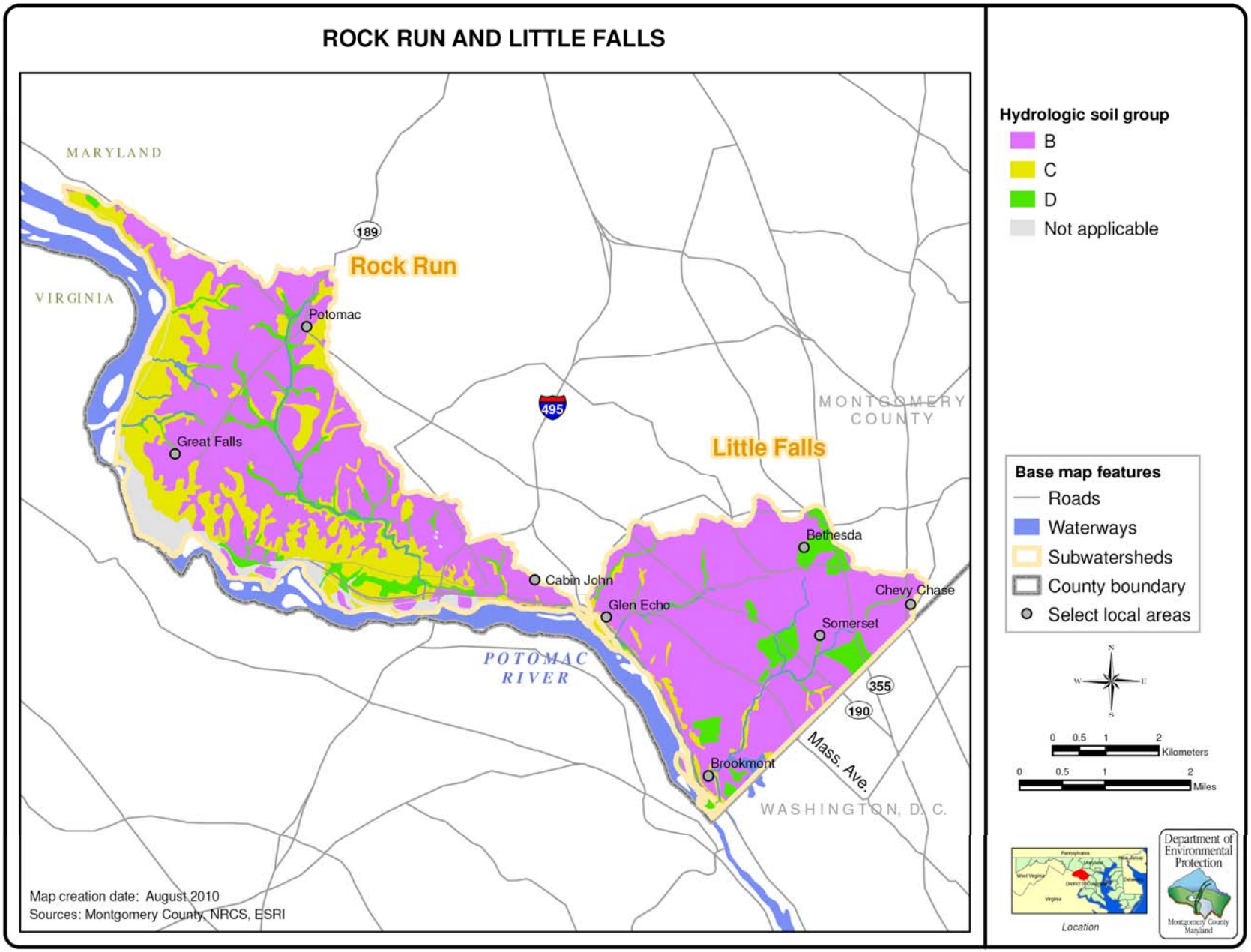

Figure 2-5. Hydrologic soil groups in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

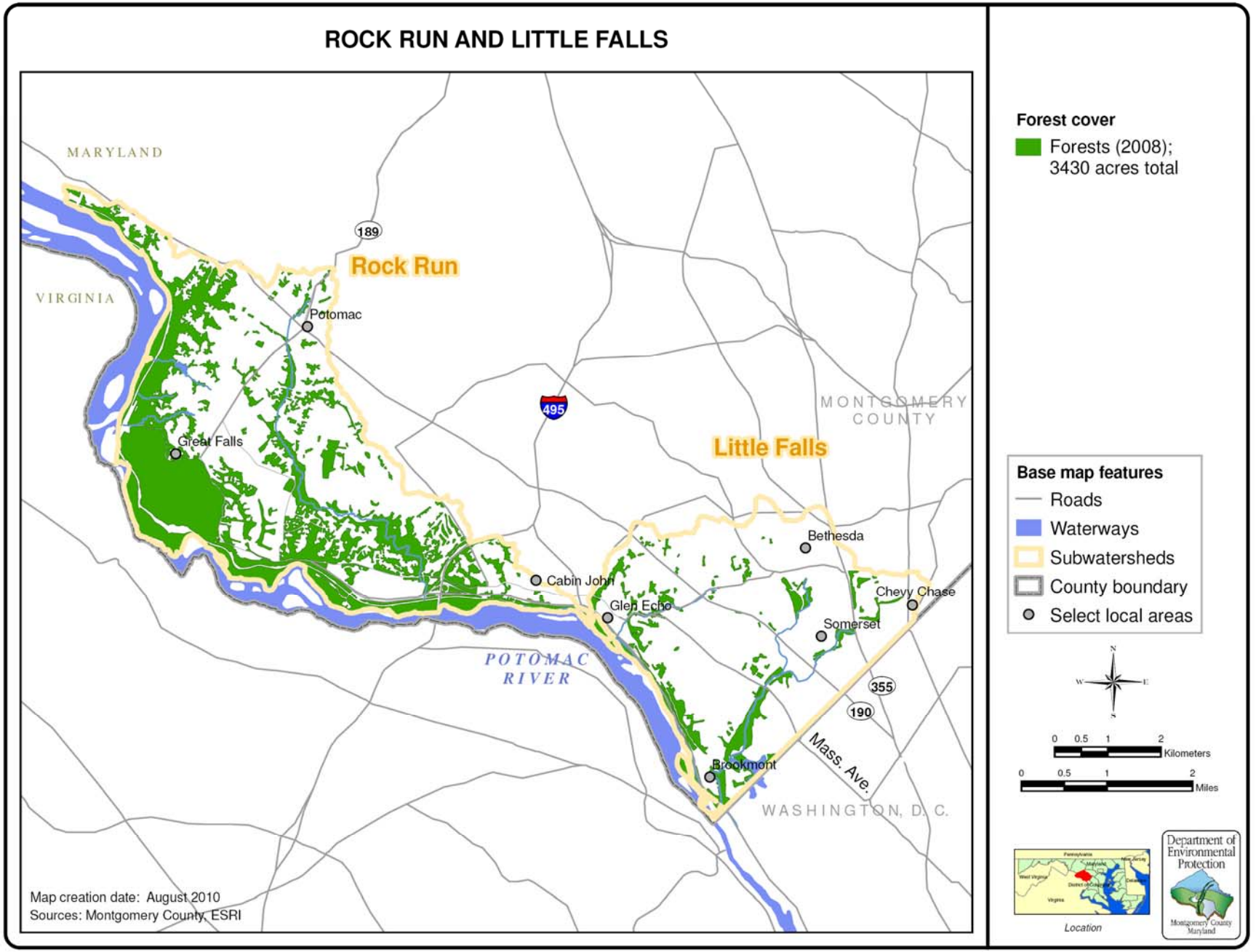

Figure 2-6. Forest cover distribution in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

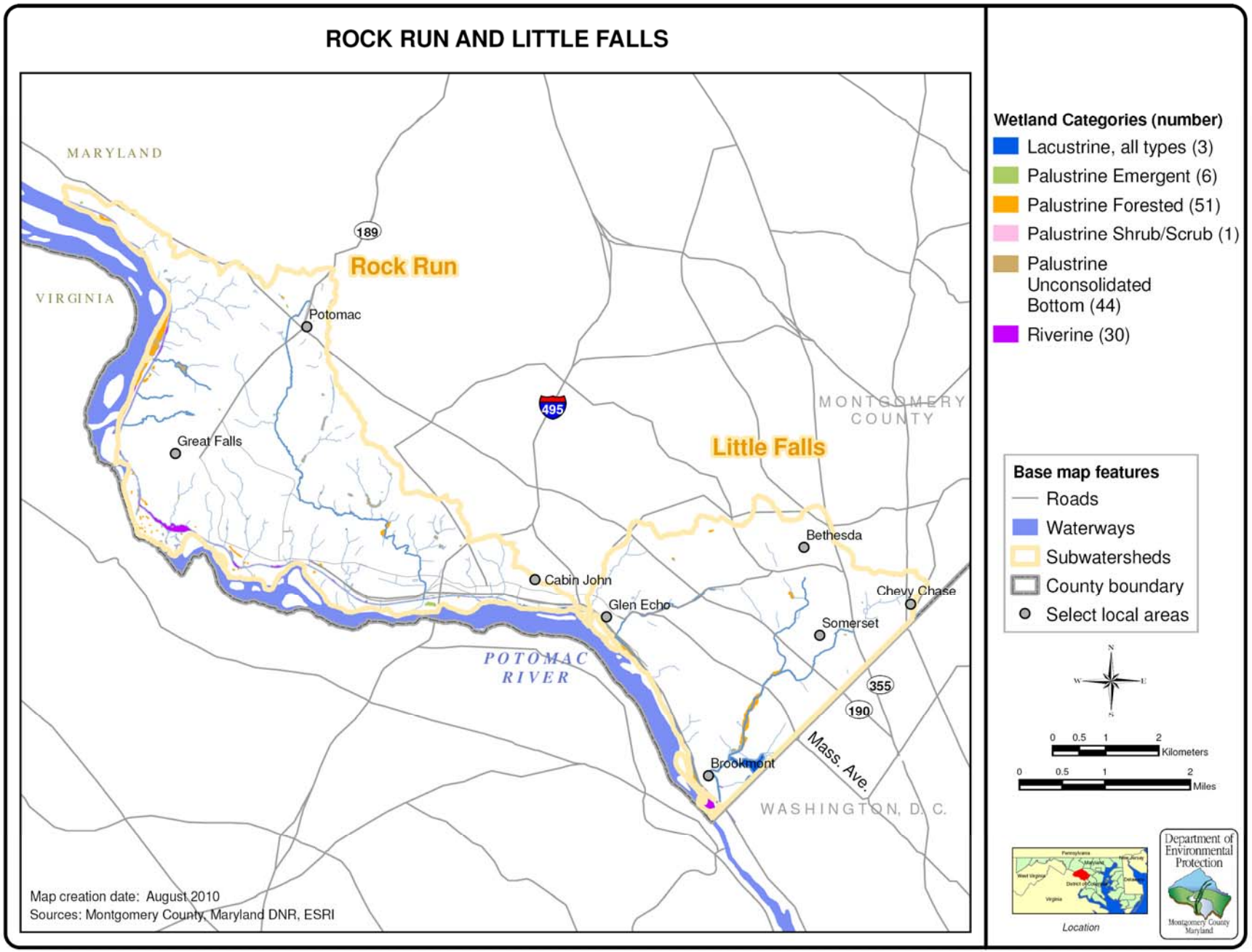

Figure 2-7. Wetland types and extent in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

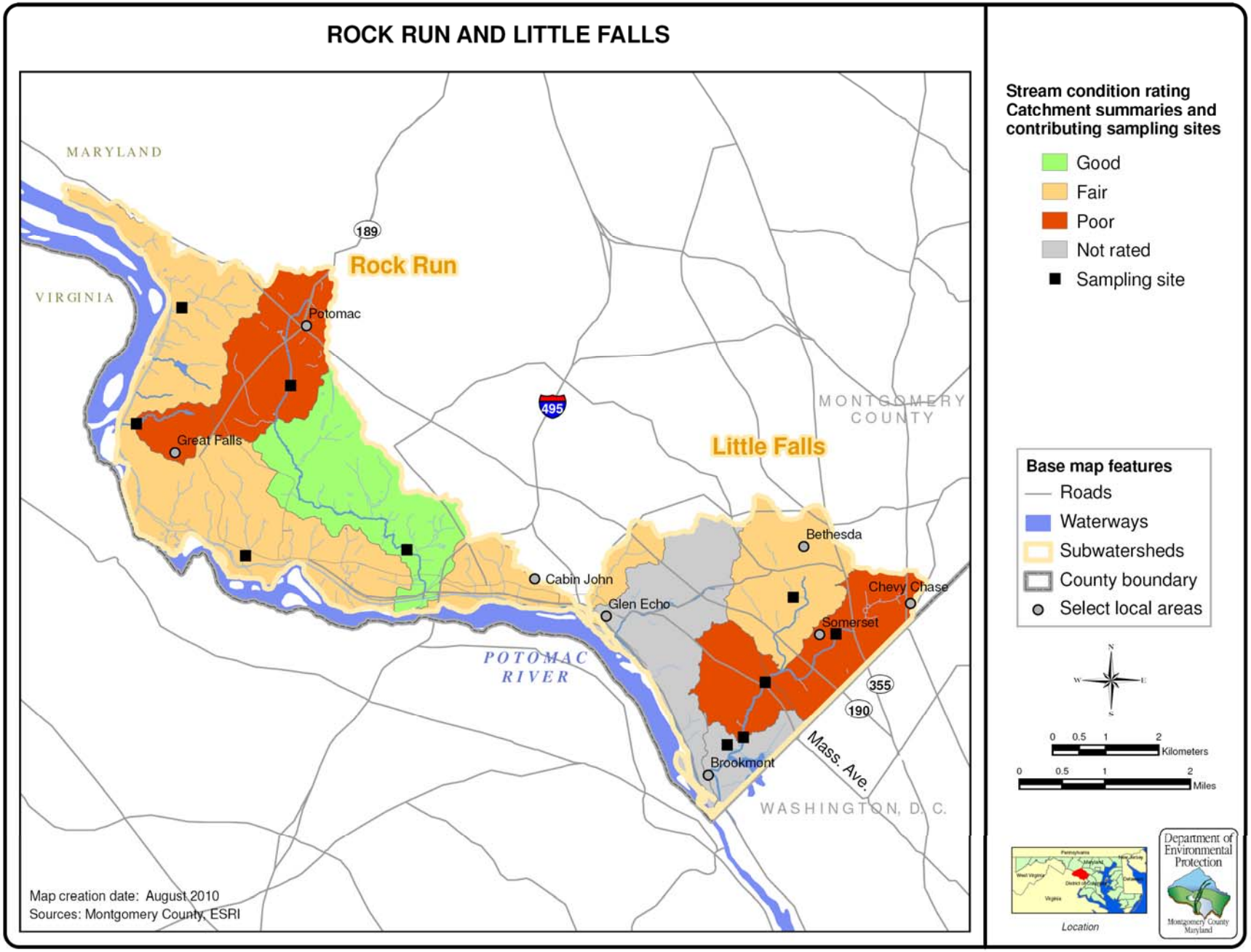

Figure 2-8. Streams condition ratings in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

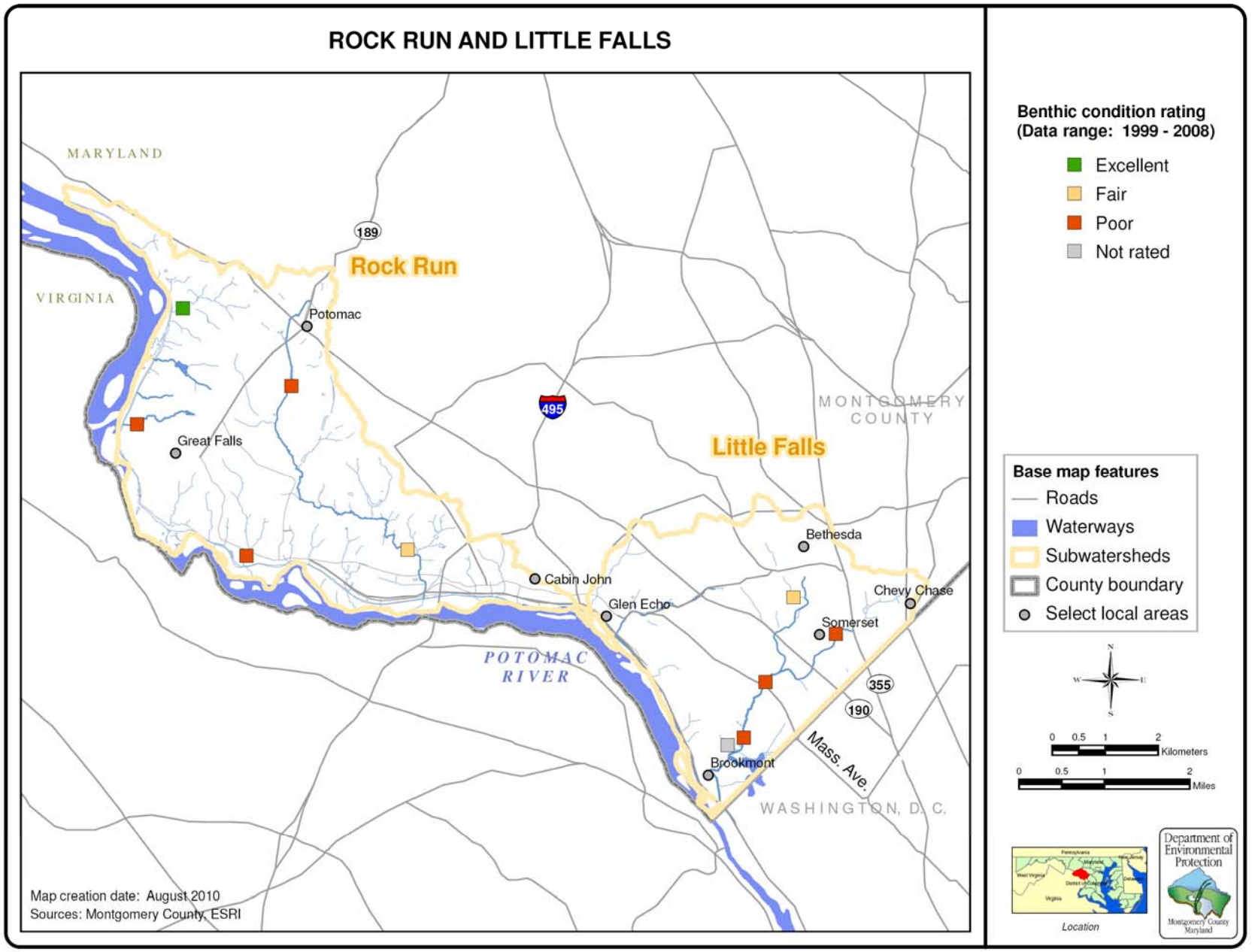

Figure 2-9. Benthic invertebrate condition ratings (BIBI) at ten sampling points, Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

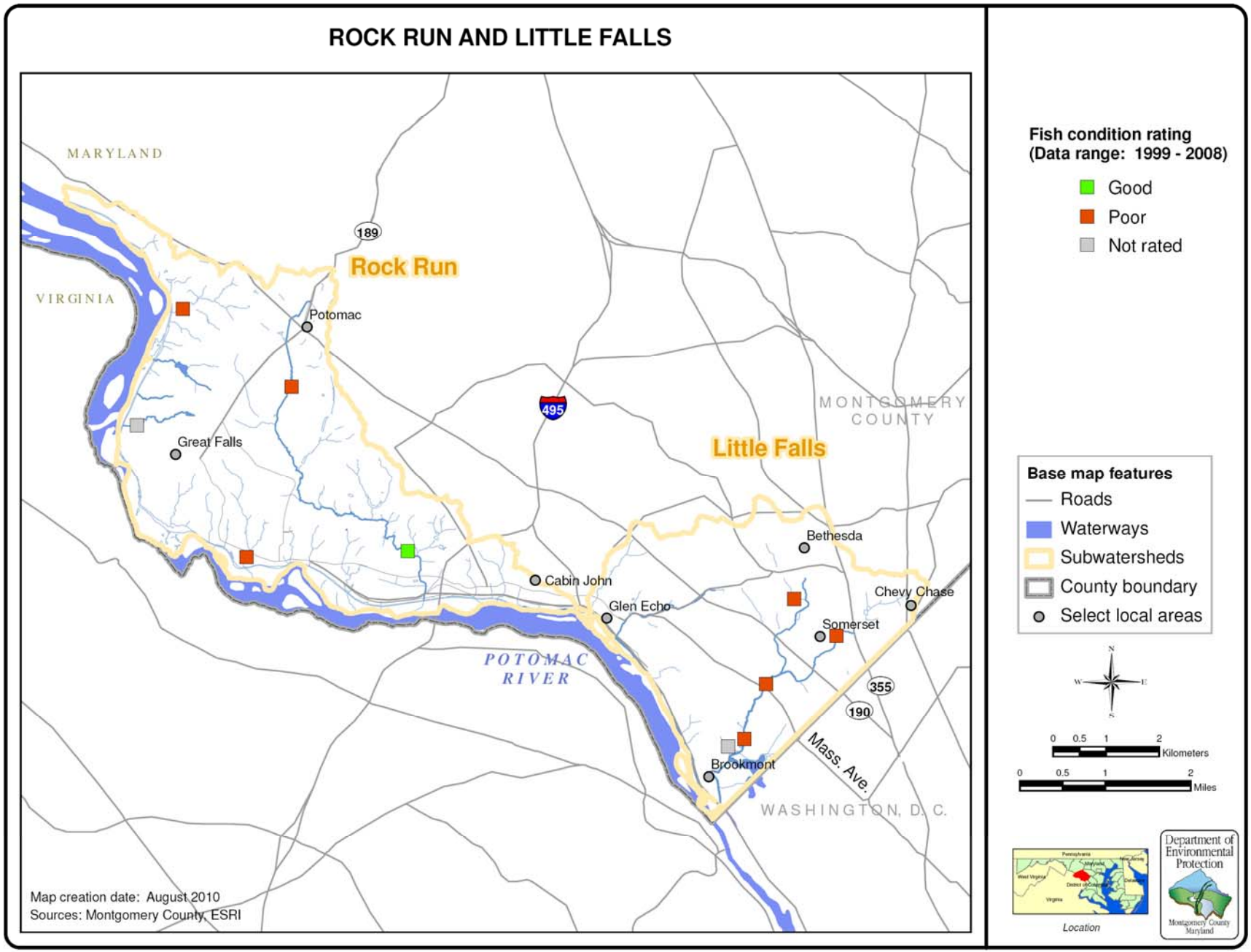

Figure 2-10. Fish condition rating (FIBI) at ten sampling points, Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

2.7 EXISTING STORMWATER BEST MANAGEMENT PRACTICES (BMPS)

Figure 2-11 illustrates the locations of existing stormwater management devices, or "BMPs," and the catchment area draining to or being "treated" by individual BMPs.

The Implementation Guidance Document for the Countywide Coordinated Implementation Strategy identifies three distinct "design eras," as follows:

- **Era 1: Pre-1986.** BMPs installed prior to full implementation of the Maryland Stormwater law of 1984, which typically focused on detention and peak discharge reduction
- **Era 2a: 1986 to 2002.** These practices reflect a design era where water quality was an important part of design, although water quality sizing and design standards were not as great.
- **Era 2b**: **2002 to 2009.** These practices were built to the more stringent water quality and channel protection sizing requirements and BMP design standards contained in the 2000 edition of the Maryland Stormwater Manual

Currently 125 BMPs exist within the subwatershed grouping; 18 were permitted before 1986 and are therefore candidates for retrofit. One hundred and four (104) facilities were permitted after 1986. Note that drainage areas for BMPs demarcated in Figure 2-11 are often smaller than the icon indicating the location of the BMP; so that the drainage area to those facilities may not be evident in the figure. The "excluded area" is also indicated in Figure 2-11. Excluded areas are lands not under the County's NPDES MS4 permit coverage (jurisdiction) but are still within the County boundary.

Table 2-3 shows the number of stormwater BMPs (facilities), the total and average drainage areas for the BMPs, as well as the impervious acres in these drainages. Only 10 BMPs are located in the excluded area but with drainage under County jurisdiction.

Table 2-3 also distinguishes between those BMPs permitted for construction before and after 1986. Significantly more BMPs were permitted after 1986 than before 1986 (104 versus 18). However, those older BMPs, permitted before 1986, treat much greater land areas on average. The average drainage area of pre-1986 facilities is 31 acres with 4.3 acres of impervious area treated on average per device, versus only 2 average drainage area acres for those facilities permitted after 1986 with only 0.8 acres of impervious area treated on average per device. This difference is readily apparent in Figure 2-11. In fact, for facilities permitted before 1986, just five facilities treat 476 of the 600 treated acres.

The trend since 1986 has been for stormwater facilities to treat much smaller drainage areas per facility and therefore to be more numerous. The total number of Low Impact Development (LID)-type practices currently in use is negligible, with only 3 facilities in Little Falls, all built after 1986.

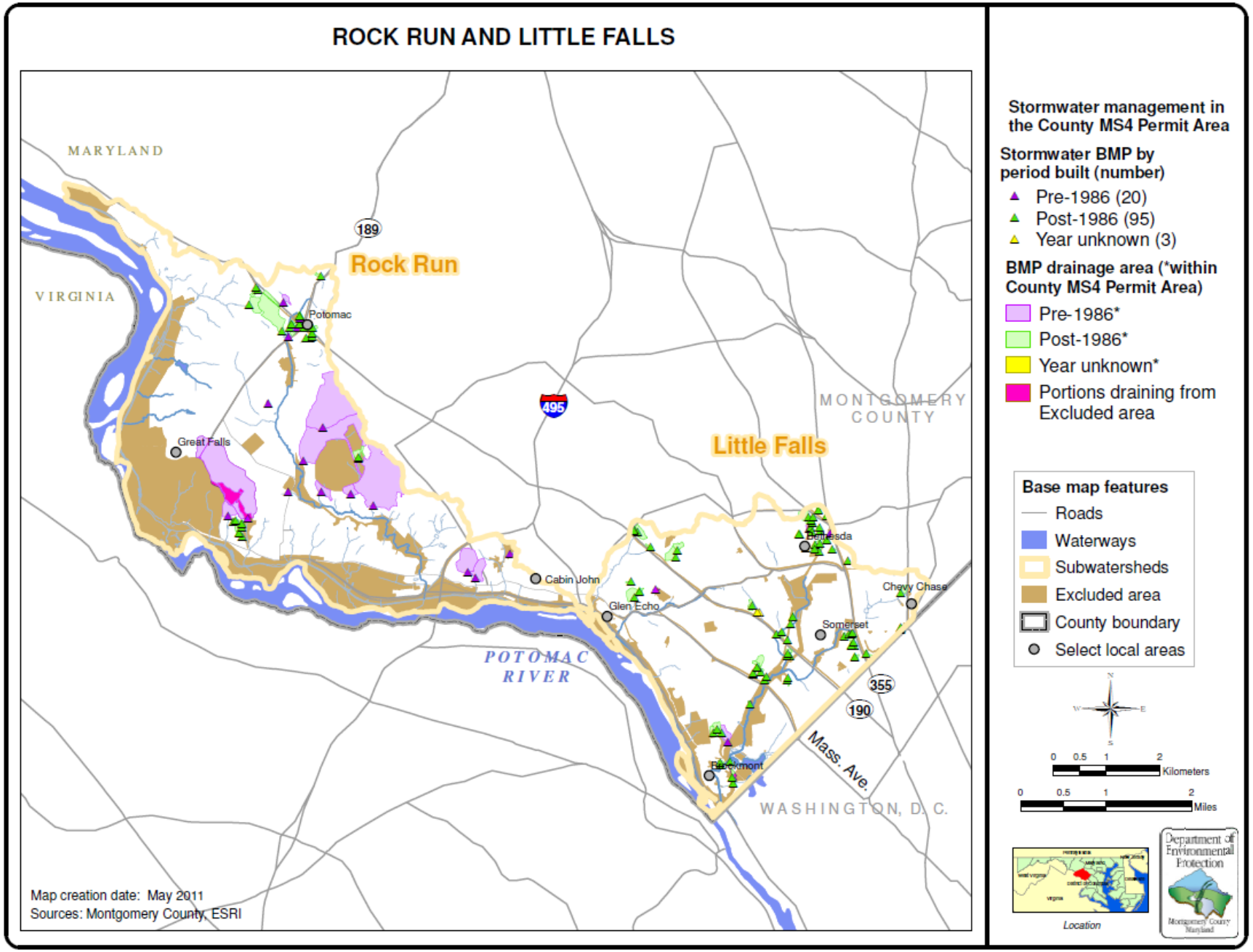

Figure 2-11. Existing stormwater management BMPs and their drainage areas, in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

Table 2-3. Characteristics of stormwater BMPs (facilities) permitted before and after 1986 in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

BMP Permit Date	Number of BMPs within County Jurisdiction	Total Drainage Area for BMPs within County Jurisdiction (acres)	Total Impervious Drainage Area (acres)	Average Drainage Area per BMP (acres)	Average Impervious Acreage Treated per BMP	Number of LID-type BMPs[a] [b] / Average Impervious Acreage Treated per LID BMP	Number of BMPs Outside of County Jurisdiction with Part or All of Drainage within County Jurisdiction	Total Drainage Area of BMPs Residing Outside County Jurisdiction (acres)
Before 1986	18	562	122	31	4.3	0	2	173
After 1986	104	203	75	2	0.8	3 [c] / 0.08	8	1
Year Not Specified	3	1	1	1.3	0.3	0	0	0
Total (all years)	125	766	199	Not Applicable	Not Applicable	3	10	174

[a] Includes those BMPs categorized by County as bio-retention-type quality control.
[b] LID exists in Little Falls only.
[c] There is one (1) acre total treated drainage area with LID –type facilities within the Little Falls subwatershed.

Table 2-3 also indicates stormwater management facilities that lie within the excluded zone, but that have drainage area both within and outside the County jurisdiction. There are 8 such facilities permitted after 1986 outside the County jurisdiction, but with a total drainage of 1 acre which is within the County's jurisdiction. In the case of facilities permitted before 1986, 2 facilities lie outside of the County jurisdiction, but with 173 acres of drainage area within the County jurisdiction. Given the larger average drainage area of these older BMPs, it makes sense that more of them would have drainage area in the excluded zone.

2.8 RIPARIAN FORESTED BUFFERS

Figure 2-12 indicates where the watershed's streams and rivers are protected by 100-foot forested stream buffers on each side of the stream (as measured from the centerline of the streams and from the shoreline of the rivers). Riparian forested buffers are being considered as a type of stormwater BMP for purposes of the NPDES MS4 permit accounting system. A minimum width of 100 feet on each side of the stream will be considered to provide nutrient and pollutant removal.

Table 2-4 summarizes presence and absence of 100-foot forested riparian buffer in the Rock Run and Little Falls subwatersheds. Notable is the significant percentage of unbuffered streams in Little Falls (57%), totaling 277 acres in need of tree planting.

Table 2-4. Forested acres and percent forest cover along 100 foot riparian buffer in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

Riparian Condition	Acres		Percent	
	Rock Run	Little Falls	Rock Run	Little Falls
Forested	773	211	60	43
Not Forested	502	277	39	57
TOTAL	1275	488	100	100

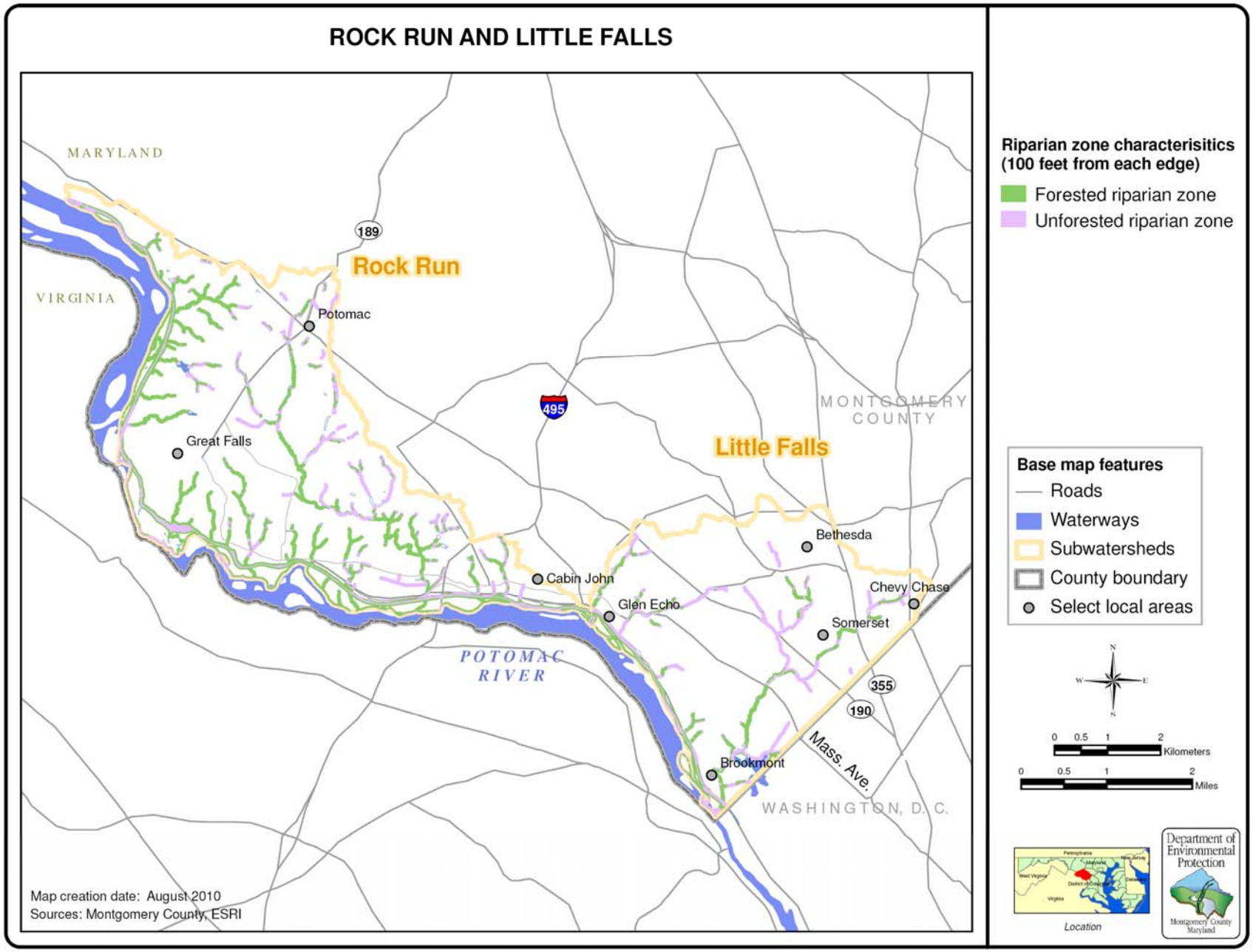

Figure 2-12. Presence or absence of forest in 100-foot riparian zone on each side of waterway, Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

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3. ACTION INVENTORY

3.1 DESKTOP ANALYSIS OF NEIGHBORHOOD-SCALE STORMWATER BMP RETROFIT OPPORTUNITIES

In coordination with Montgomery County DEP staff, priorities have been developed for implementation of candidate stormwater (BMP) retrofit projects. Figure 3-1 illustrates the location and prioritization of neighborhood-types which are grouped by Maryland Department of Planning guidelines for land-use types. Table 3-1 summarizes the total acreage and percentage associated with each land-use category and its relative contribution to the County's jurisdiction.

Table 3-1. Stormwater BMP Retrofit Priorities in Rock Run and Little Falls subwatersheds

Stormwater BMP Retrofit Priority		Candidate Acres in Subwatersheds (County Jurisdiction Only)			Percent in County Jurisdiction in Subwatersheds	
		Rock Run	Little Falls	Total Candidate Acres (Percentage of Total Candidate Acres)	Rock Run	Little Falls
High	Areas treated by Pre-1986 Permitted BMPs	724	11	735 (10.7%)	14	0
Land-use Type						
Medium - a	Commercial, Industrial, and Churches	56	210	266 (4%)	1	5
Medium - b	Private schools	1	13	14 (<1%)	0	0
Medium - c	Apartments and Condominiums	1	101	102 (<1%)	0	2
Medium - d	Townhouse	11	9	20 (<1%)	0	0
Medium - e	High and Medium Scoring Residential Neighborhood Assessment Areas	1370	2013	3383 (47%)	26	47
Low - a	Low Scoring Residential Neighborhood Assessment Areas	1814	143	1957 (3%)	35	3
Low - b	Golf courses, Rockville Wastewater Treatment Plant, and Glen Echo Heights neighborhoods	198	465	663 (9%)	4	11
	TOTAL	4175 candidate acres – or 80% of total County jurisdiction	2964 candidate acres - or 69% of total County jurisdiction	7139 candidate acres of 9508 total acres in County jurisdiction – or 75%		

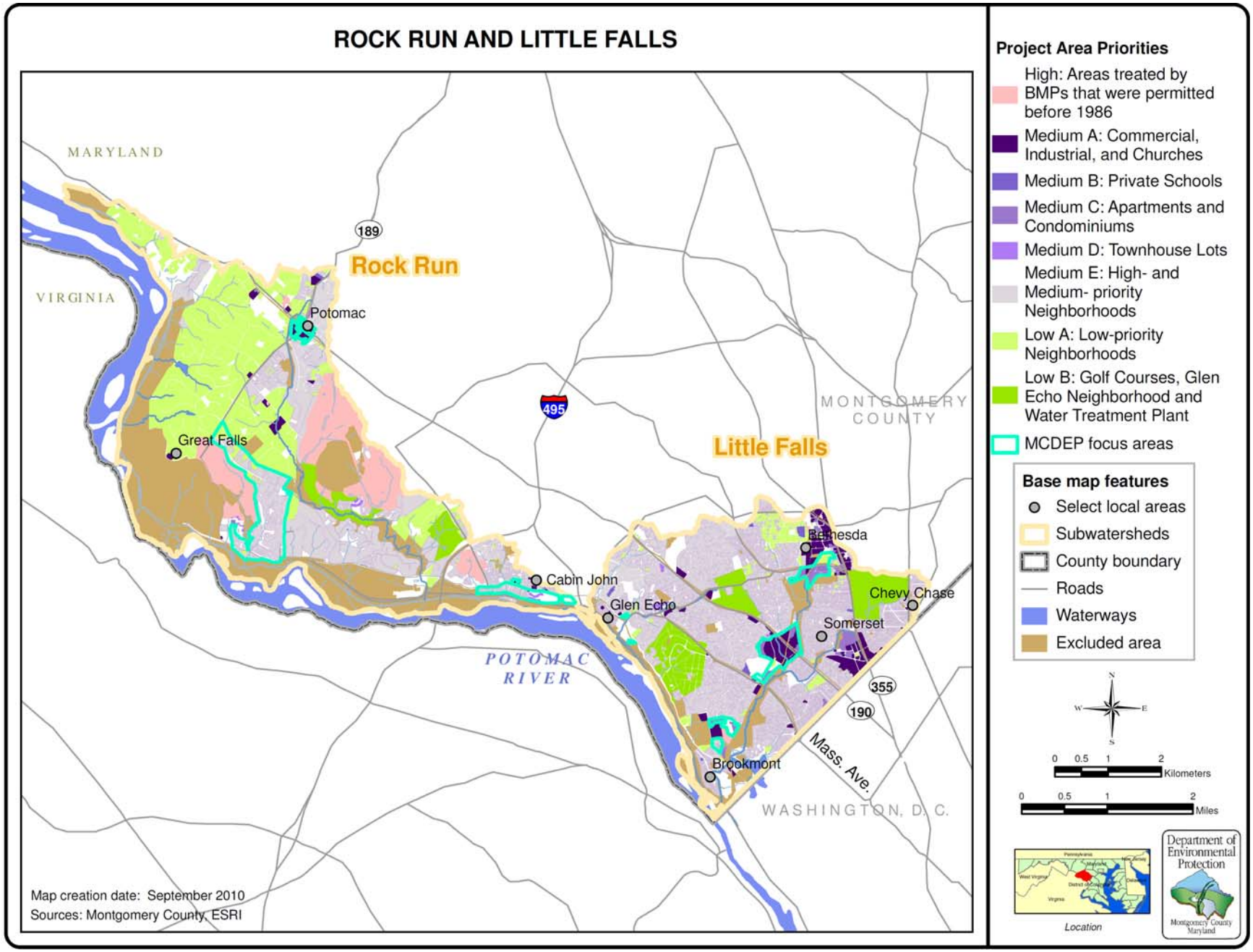

Figure 3-1. Project area priorities for candidate stormwater retrofit in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

The priorities for stormwater BMP retrofit project areas are as follows:

- **High Priority** candidate projects are modifications of or improvements to *existing BMP facilities*, which, in the case of Rock Run and Little Falls, equates to 18 facilities permitted *before* 1986, making up 735 acres or 10.7% of total candidate acreage for retrofit, almost all of which reside in the Rock Run subwatershed.

- **Medium Priority** candidate projects includes the retrofit of developed privately owned parcels which have no existing stormwater management, with prioritization by particular *land-use types*. The findings for imperviousness by land-use types are summarized below:

  a) Commercial/Industrial/Churches

  Commercial and industrial properties, and some churches, tend to have large expanses of impervious surfaces in the form of parking lots and large flat roofs, with 72% imperviousness on average and similar parts forest (14.8%) and turf cover (13%). This is the highest imperviousness of any land use in the subwatershed grouping with the exception of roadways. In the case of commercial/industrial/ churches, 266 acres or 0.4% under County jurisdiction are not currently managed for stormwater.

  b) Private Schools

  Schools tend to have large parking lots and average 35.2% imperviousness with 50% in turf cover. Total acreage for private schools is small, as is to be expected, at only 14 acres (less than 1%) of total candidate acreage.

  c) Apartments and Condominiums (Multi-Family Residential)

  Average imperviousness is 44.4%, with 14.6% in forest cover and 49% as turf. This land-use category makes up 102 candidate acres (2%) for retrofit which are almost exclusively in the Little Falls subwatershed.

  d) Townhouse Units

  This land-use type has an average of 43.8% imperviousness with 56.2% of land as turf. This land-use type makes up only 20 acres (1%) of the total candidate acreage within the County's jurisdiction.

  e) High and Medium Scoring Residential Neighborhood Assessment Areas

  These areas were determined by a desktop assessment that followed the basic approach taken in the Anacostia River Restoration Plan to target residential areas suitable for on lot retrofitting that would potentially fit into the Rainscapes program. The criteria evaluated included lot size, home ownership, presence or absence of homeowners association (HOA), and presence or absence of existing stormwater

management facilities. Neighborhood areas were then broken into tiers of high, medium, and low based on the points assigned to the various criteria.

- **Low Priority** land-uses include low percentages of impervious surfaces and are considered the lowest priority for implementation of stormwater management retrofit. They include:

  - Low A- Low Scoring Residential Neighborhood Assessment Areas

    As described above, these are the areas that ranked low under the residential neighborhood assessment.

  - Low B - Golf courses, the wastewater treatment plant in Rockville and the Glen Echo Heights neighborhoods

    Golf courses have low imperviousness (4.5%), significant turf cover (80.7%) and forest cover (14.8%), making them a low priority for stormwater retrofits. Golf courses, and the wastewater treatment plant in Rockville, and the Glen Echo Heights Neighborhood make up 9% of the candidate land-use in the subwater-sheds.

3.2 PRIORITY OPPORTUNITIES

This prioritization used in the desktop analysis is an attempt to find the best compromise between costs and benefits of potential restoration projects in the Rock Run and Little Falls subwatersheds. Eighteen (18) retrofit projects are available in the high priority category. These existing regional stormwater management facilities drain 9.9% of candidate acres available for retrofit under the County's jurisdiction in the Rock Run and Little Falls subwatershed grouping.

Medium-priority candidate projects account for 82.5% of available treatable acreage in the County's jurisdiction. Some subcategories have important secondary benefits, as is the case with private schools which offer an important opportunity to educate County residents about stormwater management.

The low priority category primarily comprises large private lots greater than 0.5 acres. While this land-use makes up 42% of total candidate acres in the subwatersheds, these lots have low percentages of imperviousness per lot.

3.3 COUNTY FOCUS AREAS

The desktop analysis, refined by first-hand knowledge provided by DEP staff who understand the historic land-use changes, planned zoning changes, planned development, status of existing stormwater BMPs, socio-political priorities, and constraints, among other factors, resulted in restoration focus areas (Figures 3-2 and 3-3). These 12 focus areas include a

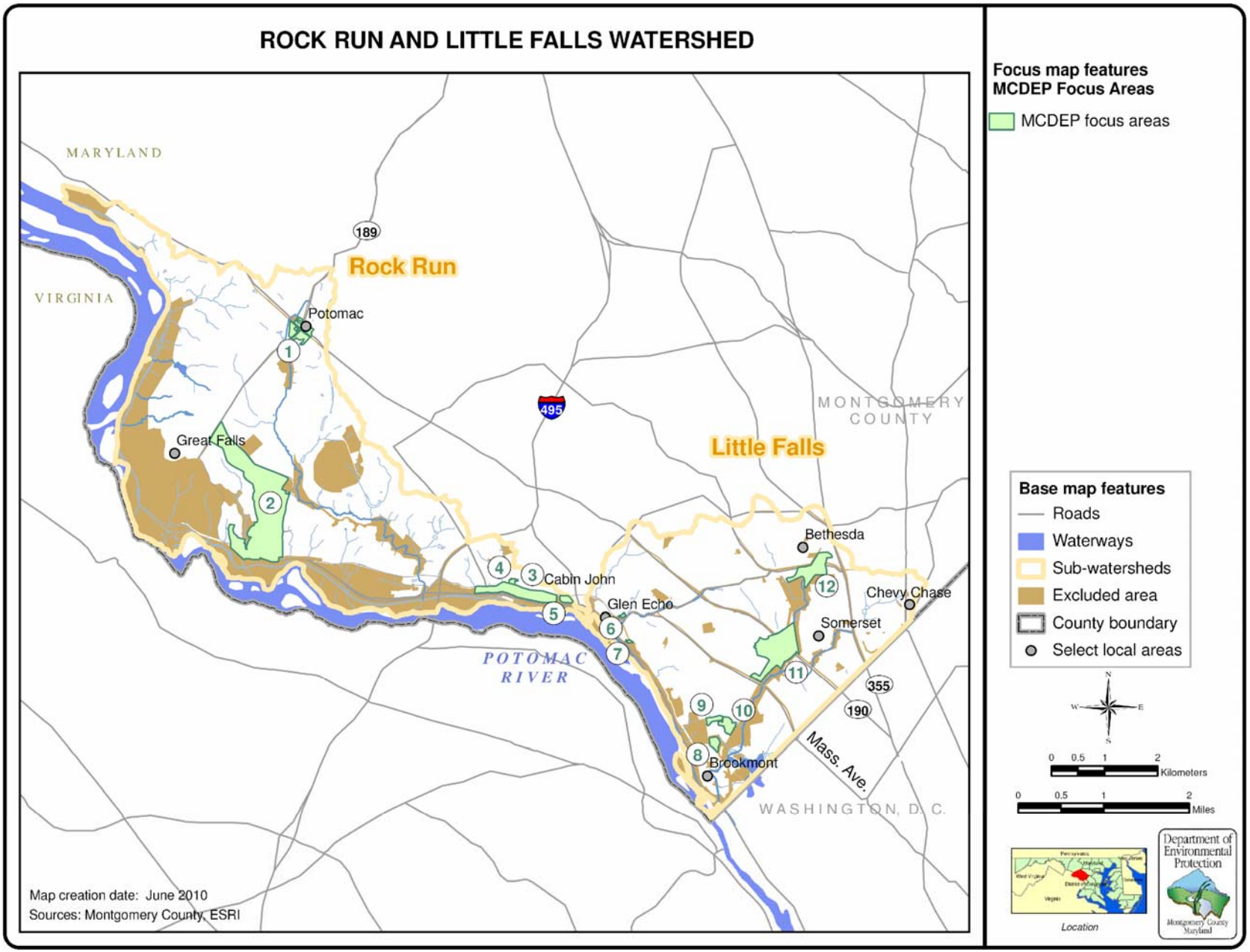

Figure 3-2. Focus areas for restoration projects identified by DEP in Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

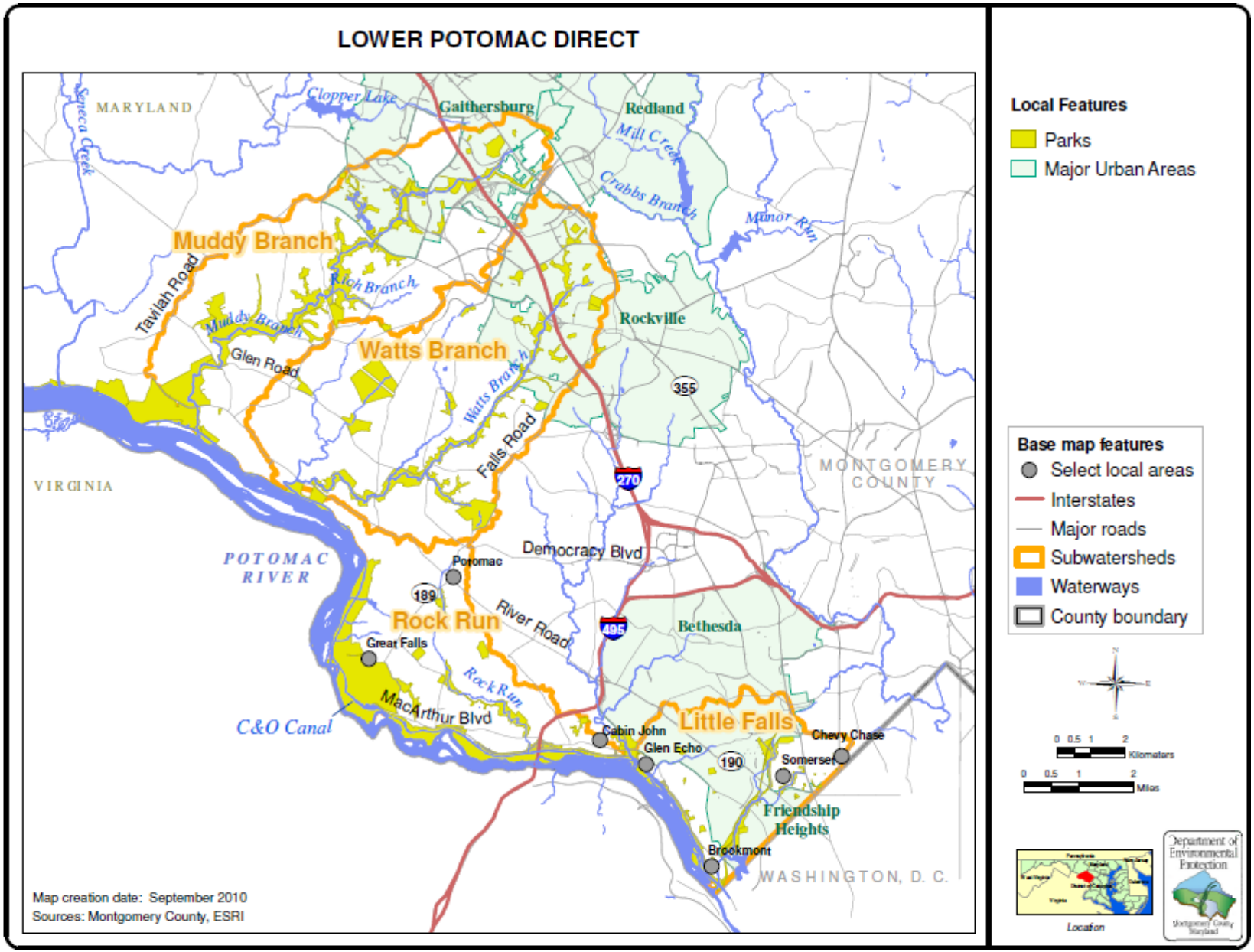

Figure 3-3. Lower Potomac Direct drainage in Montgomery County, Maryland, comprising four subwatersheds – Muddy Branch, Watts Branch, Rock Run, and Little Falls

mix of parcel sizes, primarily within the medium priority retrofit, with a few low-priority-category residential parcels greater than 0.5 acres in size. County schools are not included since these sites are being included as part of the County's public property retrofit assessments. Table 3-2 summarizes the size, amount of imperviousness, and whether a focus area currently has any stormwater BMPs in place.

Table 3-2. Untreated acres, untreated impervious area, and percent in the total untreated acres in the Focus Areas of the Rock Run and Little Falls subwatersheds, Montgomery County, Maryland

Focus Area	Subwatershed	BMP Status[(a)]	Untreated Land Area in Focus Area (Acres)	Untreated Impervious Area in Focus Area (Acres)	Untreated Percent Impervious in Focus Area (Acres)
1	Rock Run	None	23.5	14.6	61.9
1	Rock Run	Pre-1986	0.0	0.0	-
1	Rock Run	Post-1986	6.9	4.9	-
2	Rock Run	None	365.4	69.1	18.9
2	Rock Run	Pre-1986	0.0	0.0	-
3	Rock Run	None	66.5	12.6	18.9
4	Rock Run	None	2.9	1.8	61.8
5	Rock Run	None	6.7	2.2	32.6
		TOTAL	**472**	**105**	**38.8%**
6	Little Falls	None	1.5	1.2	78.0
7	Little Falls	None	1.2	0.5	42.6
8	Little Falls	None	9.3	3.0	32.4
9	Little Falls	None	7.2	3.0	42.0
10	Little Falls	None	14.7	6.5	44.3
10	Little Falls	Pre-1986	0.5	0.0	-
11	Little Falls	None	105.5	70.9	67.3
11	Little Falls	Post-1986	6.7	5.0	-
12	Little Falls	None	50.3	22.3	44.3
		TOTAL	**196.9**	**112.5**	**50.1%**
	Grand Total for Both Subwatersheds		**668.9 Untreated Focus Areas acres**	**217.7 Untreated Focus Areas Impervious acres**	**45.4% Average Imperviousness across both Subwatersheds**

(a) BMP status indicates that one or more BMPs may exist in the particular focus area of the indicated BMP treatment era. Existing BMP drainage areas have been subtracted, hence specific indication of "untreated" acres in subsequent columns.

(b) "**None"** indicates areas that do not currently have any stormwater management in place.

There are a total of 668.9 acres of untreated acres in the focus areas, 472 of which lie in the Rock Run subwatershed with the remaining 196.9 in Little Falls subwatershed. On average, 38.8% of the focus area acres in the Rock Run subwatershed are untreated impervious acres, but this varies greatly by focus area with a range of 18.9% to 61.9% untreated imperviousness.

Focus areas in the Little Falls subwatershed have a higher percentage of untreated impervious acres, 45.4% on average. Even though the Rock Run subwatershed has a greater total number of focus area acres, because the Little Falls subwatershed has a much higher percentage of average untreated imperviousness in its focus areas, the total untreated impervious acres is almost the same in both subwatersheds, 105 acres in Rock Run and 112.5 acres in Little Falls. As such it would be logical to evaluate the Little Falls focus areas first for retrofit feasibility, all other considerations being equal.

In fact, a 2009 desktop analysis and field reconnaissance effort completed in the Town of Somerset, which lies in the southern part of the Little Falls subwatershed, identified five low impact development (LID) stormwater retrofit concepts. The proposed retrofits include three bioretention devices, a grass swale, and dry swale at a total estimated cost of about $90,000. The five practices would provide stormwater management for a total of 16.7 acres. Most of the land in the Town is privately-owned residential property making treatment of large areas with individual BMPs difficult, so LID strategies were determined to be more feasible. Additionally, the Town of Somerset has several challenging characteristics limiting the opportunities for stormwater retrofits, including the prevalence of steep slopes and the lack of available stormwater infrastructure that new BMP outflows can be tied into (CWP 2009).

Together, there are 195 untreated impervious acres in the Rock Run and Little Falls subwatersheds.

3.4 EDUCATION AND OUTREACH FOR TRASH REDUCTION

There are no extensive data on specific trash and litter issues in the Rock Run and Little Falls subwatersheds. However, the entire Lower Potomac Direct is subject to conditions of the Trash Free Potomac Treaty. Since most of the developed lands are residential, it is likely that the trash reduction will occur through education and outreach. The Countywide Coordinated Implementation Strategy provides more specific guidance for using these non-structural approaches.

As is the case in other watersheds in Montgomery County, the focus for trash reduction will be through anti-littering education and outreach. In the course of developing the implementation plans, a series of practice sheets were developed to target key messages that use appropriate delivery methods for the population demographics in each watershed. It is anticipated that messages will be developed concerning dumpster management, littering enforcement, playing field trash disposal, and residential trash can maintenance.

In addition, practice sheets were developed that target reductions in private parking lot imperviousness, reduction in residential roof runoff, and riparian reforestation. All of these practices will be applied to the Lower Potomac Direct as appropriate in the implementation plan.

3.5 OTHER LOWER POTOMAC DIRECT SUBWATERSHEDS

As shown in Figure 3-3, the Lower Potomac Direct watershed grouping includes two additional subwatersheds, Muddy Branch and Watts Branch. Watts Branch encompasses 22 square miles and is roughly bounded by Falls Road to the east, Travilah Road to the west, and River Road to the south. Watts Branch flows from its headwaters in the City of Rockville to the Potomac River, eventually reaching the Chesapeake Bay (MC DEP 2003 – Task 1 Report). Muddy Branch encompasses 75 square miles (USACE 2009) and originates in the City of Gaithersburg with significant development along Route 355 and the railroad. The developed areas with the highest levels of imperviousness are located in the headwaters of the watershed; development densities decrease steadily in the downstream direction.

Watts Branch was the subject of a Watershed Restoration Study completed in 2006 as part of the Countywide Stream Protection Strategy. The Study consisted of three tasks:

- Summarizing existing conditions, and identifying and prioritizing impaired subwatersheds
- Identifying stormwater management opportunities and developing concept designs for the top sites
- Preparing specific stream and floodplain restoration concept designs, ranking the concept designs by subwatershed, and developing preliminary cost information for stream improvements.

This study targeted 14 out of the 65 total smaller subwatersheds in Watts Branch for further stormwater management and stream restoration opportunity investigation. Additionally, the County has identified stormwater retrofits capable of treating 100 acres of impervious cover in the Watts Branch subwatershed.

Muddy Branch, along with Great Seneca Creek, is the focus of an ongoing U.S. Army Corps of Engineers (USACE) watershed ecosystem restoration project. The USACE Great Seneca Creek/Muddy Branch Watersheds Ecosystem Restoration Project study goals and objectives include the following:

- Study and document existing watershed conditions
- Identify problems and potential solutions for each watershed
- Identify stormwater management and stream restoration needs and opportunities
- Recommend methods to restore aquatic, wetland and riparian habitat and function
- Develop upstream and upland strategies to maintain long-term viability of aquatic habitat restoration efforts
- Protect the Potomac River and the Chesapeake Bay through restoration of these tributaries

- Identify opportunities to reduce sediment and nutrient loads to the mainstem Potomac River and Chesapeake Bay.

Currently USACE is working with the County to identify priority stream restoration sites (approximately 5 miles have been identified) and upstream stormwater retrofits associated with those stream locations. The County has already identified a number of stormwater retrofits to manage runoff from approximately 250 impervious acres.

Implementation plans are under development for both the Muddy Branch and Watts Branch subwatersheds, which will address the requirements of the MS4 permit and meet watershed restoration goals. These include:

- Watershed restoration via runoff management
- Trash and litter management for a trash-free Potomac as per the Trash-Free Potomac Treaty.

3.6 NEXT STEPS

As described above, this pre-assessment for the Rock Run and Little Falls subwatersheds is the first step in developing a watershed assessment and implementation plan for this part of the Lower Potomac Direct watershed grouping. When combined with the Muddy Branch and Watts Branch implementation plans, these plans will detail how the County will meet its MS4 permit obligations, which include addressing any waste load allocations (WLAs) for EPA-approved Total Maximum Daily Loads (TMDLs), as well as restoring an additional 20% of the total untreated impervious acres to the MEP on a Countywide basis during the five-year permit cycle, and providing trash and litter management as a condition of the Trash-Free Potomac Treaty.

3.6.1 Steps to Complete the Watershed Assessment

As described in the Watershed Restoration Plan Framework, the watershed assessment for Rock Run and Little Falls will add to the Pre-Assessment by updating any environmental condition information and conducting field investigations to identify specific watershed restoration sites. Following the field investigations, concept plans would be developed for candidate restoration sites as part of the action inventory. Pollutant loading estimates and public involvement would also be conducted to assign priorities and integrate the watershed assessment into the Countywide Coordinated Implementation Strategy.

Field Investigations. The ideal method for identifying restoration sites is to complete comprehensive stream and upland walks to ground truth the pre-assessment, watershed-wide. Recognizing budget constraints, we recommend that the field investigations be targeted to the high-priority areas identified by the desktop analysis for the pre-assessments, as well as the medium- and low-priority “focus” areas identified by DEP staff. The high-priority areas are

existing BMPs that can be retrofitted, while the focus areas comprise the best candidate areas of varying land use types based on institutional knowledge.

The pre-assessment desktop analyses for Rock Run and Little Falls identified high-, medium- and low-priority areas, and calculated the potentially treated acres of impervious surface for each (Table 3-3). If pre-1986 stormwater BMPs are retrofitted, 122.7 acres of additional imperviousness within the MS4 would be treated. In addition, if the County's Focus Areas impervious which is not already being treated is retrofitted, 217.7 acres would be controlled.

Table 3-3. Lower Potomac Direct (Rock Run and Little Falls) Impervious Area for County MS4.

Impervious area	Acres
County MS4 total impervious cover	1788.3 acres
Remainder untreated	1713.4 acres
Focus Area projects impervious	217.7 acres
Pre-1986 Stormwater BMP retrofit treatment	122.7 acres
Post-1986 BMP treatment	74.9 acres

An estimation of potential load reductions from treating Focus Areas impervious acres, all within the County MS4 for TN, TP and TSS is summarized in Table 3-4 below.

Table 3-4. Lower Potomac Direct (Rock Run and Little Falls) estimated TN, TP, and TSS load abated for treating impervious acres in designated Focus Areas, Montgomery County MD. *

	TN Potential abatement (lbs)	TP Potential abatement (lbs)	TSS Potential abatement (tons)
Focus Area Impervious not currently controlled (218 acres)	**3022**	**378**	**135,581**

*Assumes these areas have no BMPs currently and that they would be 100% retrofitted with Code 4 (ESD practices)
TN abated at 14 pounds per impervious acre
TP abated at 1.7 pounds per impervious acre
TSS abates at 623 tons per impervious acre

We recommend that the Rock Run and Little Falls watershed assessment include the following field investigations:

- Stream Reconnaissance. Conduct stream corridor assessments (SCAs) or comparable investigations of the streams within the 616 untreated acres in the focus areas. The stream reconnaissance might address the entire untreated stream network or focus

on the stream miles nearest to the 195 acres of untreated impervious surface to reduce the level of effort.

- Retrofit Investigations. Conduct retrofit reconnaissance investigations (RRIs) or comparable investigations at sites identified in the stream reconnaissance, as well as the 18 BMPs constructed before 1986. We estimate that approximately 50 retrofit investigations may be needed to address the 195 acres of untreated impervious surface.

- Upland Investigations. Conduct hotspot investigations (HSIs), neighborhood source assessments (NSAs), and pervious area assessments (PAAs) or comparable investigations at sites identified in the stream reconnaissance. These investigations would identify source reductions and additional restoration practices beyond those identified in the retrofit investigations. Perhaps a dozen of each type of investigation would be necessary to identify specific practices to address the remaining acres of untreated impervious surface.

These field investigations may require approximately $150,000 of effort.

Action Inventory. Following the field investigations, completion of the watershed assessment for Rock Run and Little Falls would involve completing the Action Inventory using the following steps:

- Concept Plans for Restoration Projects would follow the 2009 Maryland Stormwater Design Manual and address treatment of water quality and water quantity, providing stream channel protection as appropriate. We estimate that 50 concept plans would be developed for a level of effort of $150,000.

- Community Education and Stakeholder Involvement would be an extension of the Public Outreach and Stewardship Work Plan developed as part of the Countywide Coordinated Implementation Strategy. This level of effort is estimated at $50,000.

- Pollutant Loads and Anticipated Load Reductions would be determined using the simple WTM modeling approach defined in the Guidance Document. This level of effort is estimated at $50,000.

- Priorities for Proposed Projects would be developed using a scoring and ranking system that reflects County priorities and is conducive to implementation planning.

- Preliminary Action Inventory. As described above there should be sufficient projects within the existing BMP retrofits and focus areas to treat an additional 7139 acres of impervious area. Whether additional projects will be needed to meet TMDL or trash reduction targets will be determined by the modeling to be conducted as part of the full watershed assessments.

The action inventory obtained from the Rock Run and Little Falls watershed assessment would support the development of an implementation plan per the Guidance Document and meet the County obligations under the MS4 permit. The estimated level of effort developing the priorities and integrating public involvement into the effort to complete the action inventory is $50,000.

The estimated level of effort for all aspects of the watershed assessment for the Lower Potomac Direct is $500,000.

4. REFERENCES

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